Competition, cooperation and communication: a theoretical analysis of different sources of environmental policy convergence and their interaction

Holzinger, Katharina; Knill, Christoph

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A Theoretical Analysis of Different Sources of Environmental Policy Convergence and Their Interaction

Katharina Holzinger and Christoph Knill

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Institut für Höhere Studien (IHS), Wien
Institute for Advanced Studies, Vienna

Contact:

Katharina Holzinger
University of Hamburg
☎: ++49 40 42838 4693 / 3551 Secretary
email: holzinger@sozialwiss.uni-hamburg.de

Christoph Knill
University of Konstanz
☎: ++49 7531 88 3553
email: christoph.knill@uni-konstanz.de

Founded in 1963 by two prominent Austrians living in exile – the sociologist Paul F. Lazarsfeld and the economist Oskar Morgenstern – with the financial support from the Ford Foundation, the Austrian Federal Ministry of Education, and the City of Vienna, the Institute for Advanced Studies (IHS) is the first institution for postgraduate education and research in economics and the social sciences in Austria. The **Political Science Series** presents research done at the Department of Political Science and aims to share "work in progress" before formal publication. It includes papers by the Department's teaching and research staff, visiting professors, graduate students, visiting fellows, and invited participants in seminars, workshops, and conferences. As usual, authors bear full responsibility for the content of their contributions.

Das Institut für Höhere Studien (IHS) wurde im Jahr 1963 von zwei prominenten Exilösterreichern – dem Soziologen Paul F. Lazarsfeld und dem Ökonomen Oskar Morgenstern – mit Hilfe der Ford-Stiftung, des Österreichischen Bundesministeriums für Unterricht und der Stadt Wien gegründet und ist somit die erste nachuniversitäre Lehr- und Forschungsstätte für die Sozial- und Wirtschafts-wissenschaften in Österreich. Die **Reihe Politikwissenschaft** bietet Einblick in die Forschungsarbeit der Abteilung für Politikwissenschaft und verfolgt das Ziel, abteilungsinterne Diskussionsbeiträge einer breiteren fachinternen Öffentlichkeit zugänglich zu machen. Die inhaltliche Verantwortung für die veröffentlichten Beiträge liegt bei den Autoren und Autorinnen. Gastbeiträge werden als solche gekennzeichnet.

Abstract

Comparative studies on cross-national policy transfer and diffusion emphasize an impressing degree of policy convergence in many areas. This holds true, in particular, for the environmental field. However, we are still confronted with limited knowledge about the mechanisms accounting for this phenomenon. Against this backdrop, we theoretically investigate the impact of three different convergence mechanisms that are generally seen as central sources of cross-national policy convergence: regulatory competition, international cooperation and transnational communication. We focus not only on the isolated effects of each mechanism, but also on the effects of their interaction. As will be shown, the empirically rather likely interaction of different mechanisms constitutes a plausible explanation for the still puzzling gap between the theoretical prediction of a race to the bottom through regulatory competition and the lacking empirical support for this hypothesis.

Zusammenfassung

Vergleichende Studien zu Politiktransfer und Politikdiffusion haben für viele Bereiche eine beträchtliche Konvergenz von Politiken festgestellt. Das gilt insbesondere für die Umweltpolitik. Es ist jedoch noch wenig über die Mechanismen bekannt, die dieses Phänomen verursachen. In diesem theoretischen Beitrag werden drei Faktoren analysiert, die als wichtige internationale Antriebskräfte der zwischenstaatlichen Politikkonvergenz gelten: Regulierungswettbewerb, internationale Kooperation und Harmonisierung sowie transnationale Kommunikation und Policy-Lernen. Wir betrachten dabei nicht nur die jeweiligen isolierten Wirkungen der einzelnen Faktoren, sondern auch die Effekte ihrer Interaktion. Es wird gezeigt, dass die empirisch recht wahrscheinliche Interaktion dieser Mechanismen eine plausible Erklärung bietet für die Kluft zwischen der theoretischen Vorhersage eines „race to the bottom“ der umweltpolitischen Standards und dem Mangel an empirischen Belegen für ein solches Ergebnis.

Keywords

Schlagwörter

Konvergenz, Politiktransfer, Politikdiffusion, Regulierungswettbewerb, internationale Harmonisierung, Policy-Lernen

General note on content

The opinions expressed in this paper are those of the author and not necessarily those of the IHS Department of Political Science

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Introduction

Comparative studies on cross-national policy transfer and diffusion emphasize an impressing degree of environmental policy convergence which cannot only be observed across the member states of the European Union (EU), but also at the level of the OECD (Jänicke and Weidner 1997; Kern, Jörgens and Jänicke 2001). On the other hand, research findings provide only limited empirical support for the often predicted race to the bottom as a result of regulatory competition between states (Tobey 1990; Levinson 1996, 1997; Wilson 1996). Convergence obviously does not coincide with a general decrease in environmental protection levels.

Which factors account for the striking degree of environmental policy convergence and how can we explain that convergence levels only in rare cases reflect the outcome of a race to the bottom? In the literature, we are confronted with still limited knowledge about the causes and conditions of cross-national policy convergence (Drezner 2001; Hoberg 2001). These deficits hamper the analysis of causal relationships between individual convergence mechanisms and their effects. They are even more pronounced, however, when it comes to the question of how different mechanisms might interact – an empirically rather likely constellation.

It is the objective of this article to address these analytical problems. We aim to develop theoretical expectations about the degree and levels of cross-national policy convergence not only for individual mechanisms, but also with respect to potential interaction effects. We concentrate on three mechanisms, which are generally viewed as the most important driving forces of policy convergence, namely, regulatory competition, international cooperation and transnational communication. We develop our argument against the empirical background of policy convergence in the environmental field. Although many of our considerations might be generally valid, this more restrictive approach is justified by the fact that relevant convergence mechanisms and their effects might vary across policy areas.

The article proceeds as follows. In a first step, we introduce the different convergence mechanisms under investigation and our conception of policy convergence (section 2), In a second step, we develop hypotheses not only on the conditions under which cross-national policy convergence will occur, but also on the degree and level to which national policies convergence. While in section 3, the focus is on the analysis of individual convergence mechanisms, the interaction effects between different mechanisms are analyzed in section 4.

1 Mechanisms and Concepts of Environmental Policy Convergence

Cross-national policy convergence is generally defined as increase in policy similarity between countries over time (Bennett 1991, 219). Policy convergence thus constitutes the result of a process; it implies a movement from diverse positions towards some common point. Knowing that national policies are alike tells us nothing about convergence. While this aspect is rather uncontested in the literature, the picture is less clear when it comes to underlying causes and conditions of convergence. Although there is considerable overlap, the type and number of identified mechanisms strongly vary, depending on the underlying theoretical focus of the different studies.

In view of this conceptual variety, it is not our intention to provide an encompassing classification of convergence mechanisms. Rather we concentrate on the analysis of three mechanisms which are generally considered as major driving forces of cross-national policy convergence: regulatory competition, international cooperation, and transnational communication (Bennett 1991; DiMaggio and Powell 1991; Dolowitz and Marsh 1996, 2000; Hoberg 2001).

1.1 Three Convergence Mechanisms

A first mechanism of cross-national policy convergence is *regulatory competition* which generally emerges as a result of economic integration. The concept of regulatory competition is based on economic theories of systems competition or regulatory competition (Tiebout 1956; Oates and Schwab 1988). While the economic literature focuses on normative questions, such as the effect of systems competition on efficiency or democracy, the political science literature has concentrated on the question of whether regulatory competition actually works and whether it induces races to the top or bottom.

With the increasing integration of global markets and the abolition of national trade barriers, the international mobility of goods, workers and capital puts pressure on national governments to redesign domestic market regulations in order to attract foreign investment and to avoid regulatory burdens restricting the competitiveness of domestic industries threatening to shift their activities elsewhere (Goodman and Pauly 1993; Keohane and Nye 2000).

This way, regulatory competition among governments may lead to a race to the bottom in environmental policy, implying policy convergence at the lowest common denominator: states will gravitate towards the regulatory level of the most laissez-faire country (Drezner

2001, 59). However, notwithstanding the seemingly clear and concise argument, the empirical literature provides only limited support for it (van Beers and van de Bergh 1999; Levinson 1996, 1997; Tobey 1990; Vogel 1995; Wilson 1997).

The second convergence mechanism under investigation refers to legal obligations emerging from *international cooperation*. As a result of international agreements, national governments are legally required to adopt policies and programs (Bennett 1991, 225; Dolowitz and Marsh 2000, 15). This mechanism is traced to the existence of interdependencies which push governments to resolve common problems through cooperation within international institutions, hence sacrificing some independence for the good of the community (Hoberg 2001, 127). Once established, institutional arrangements will constrain and shape domestic policy choices, even as they are constantly challenged and reformed by their member states (Martin and Simmons 1998, 743). However, as member states voluntarily engage in international cooperation and actively influence corresponding decisions and arrangements, the impact of international legal obligations on national policies constitutes no hierarchical process; it can rather be interpreted as "negotiated transfer" (Dolowitz and Marsh 2000, 15).

Finally, the literature emphasizes varying convergence mechanisms which are based on *transnational communication*. The first scenario of policy emulation implies the simple copying of policy decisions taken elsewhere. This pattern is generally explained by a broad variety of factors, including the number of countries which have already adopted a certain policy (Meyer and Rowan 1977), the striving for legitimacy in constellations of high uncertainty (DiMaggio and Powell 1991, 70), the desire of actors not to be left behind (Meyer et al. 1997), the existence of time-pressures (Bennett 1991, 223), or the striving to avoid high costs of information which are probably much less with simple imitation than with more demanding forms of learning (Simmons and Elkins 2003).

Second, policy convergence can be the result of learning processes, understood as the rational utilization of available experience elsewhere. In contrast to policy emulation, however, the concept of learning implies that there may be considerable deviation from the models found in other countries (Rose 1991). Learning through transnational communication is not restricted to bilateral policy transfer, but can also result from the development of common problem perceptions and corresponding solutions within transnational elite networks or epistemic communities (Haas 1992). Convergence in this sense results from the development of shared ideas and beliefs amongst a relatively coherent and enduring network of elites engaging in regular interaction at the transnational level (Bennett 1991, 224).

A third convergence factor linked to transnational communication is the promotion of policy models by international institutions. They often play a highly active role, driving the spread of distinctive policy approaches through performance comparisons. Cross-national policy

transfer is stimulated by international agreements on broad goals and standards that national policies should aim to achieve, institutionalized peer review and identification of best practice (benchmarking) as well as the construction of league tables ranking national policies in terms of performance to previously agreed criteria (Humphreys 2002, 54). In constantly searching for new policy ideas, disseminating best practice and evaluating domestic policy performance, international institutions function as mediators of cross-national policy transfer, driving national governments to adopt successful policy models (Kern, Jörgens and Jänicke 2001, 10).

1.2 Isolated Effects and Interaction of Mechanisms

Analyzing the impact of these mechanisms on environmental policy convergence, the first question to be addressed is: Which effects have the mechanisms individually? It is difficult, however, to isolate the effects of each mechanism empirically. However, not every mechanism is effective in all countries and all environmental policy areas. For example, regulatory competition is only effective among market economies and in environmental policy areas where a policy change factually affects the competitive position of a country. Similarly, international cooperation does not take place in all fields of environmental policy. Thus, the conditions under which the mechanisms affect policy convergence differ for each factor. They have individual "scopes of effectiveness", which are not fully congruent but have intersections with the other factors.

The second question to be addressed is: What are the interaction effects of the three mechanisms? Are the convergence effects strengthened by the interaction of several factors? Are they diminished? Or does one factor dominate the other(s) and if so, under which conditions? The scopes of effectiveness of the mechanisms potentially overlap both with respect to policies and to countries.

1.3 Research Questions and Conception of Convergence

In the following sections, we develop hypotheses on both individual and interaction effects of the three convergence mechanisms. They are related to two aspects:

(1) the expected degree of convergence implied by the underlying mechanisms; and

(2) the expected level of convergence for each mechanism (Can we expect a regulatory race to the top or a race to the bottom?).

With respect to convergence, we focus on *policy output*; i.e., the policies adopted by a government. We do not consider policy outcomes, because they are usually affected by

many intervening variables, and hence can only be indirectly related to the causal mechanisms of convergence. It would not be too surprising if we found convergence at the level of output, but divergence at the level of outcome (Inkeles 1981, 32).

In many cases, it is impossible to formulate hypotheses on the level of convergence. The level or "point" of convergence is usually related to the extent of state intervention or to the strictness of a regulation. Lax standards or laissez-faire policies are identified with the "bottom", strict standards or interventionist policies with the "top" (Drezner 2001, 59-64). However, it is not always easy to identify what the top and the bottom is in environmental policy. When general principles or policy instruments are compared (such as sustainable development or the polluter pays principle), it does not make much sense to speak of levels of convergence. Only in rare cases a certain instrument or policy idea can be assumed to provide stricter (or less strict) regulation than another one. Therefore, the level of convergence can only be measured when the policies under consideration come in degrees which can be associated with a normative judgment on the quality of an intervention. Typical examples are the levels of environmental standards or taxes.

The idea of convergence of policies implies decrease in variation of policies among the countries under consideration over time. Thus, convergence is the decrease of standard deviation from time t_1 to t_2. A change in the regulatory level implies an upward or downward shift of the mean from time t_1 to t_2 (Botcheva and Martin 2001, 4). Convergence at the top or bottom presupposes therefore both decrease of standard deviation and a shift of the mean. To assess the extent of convergence, as well as shifts in the level of regulation a point of reference is needed. We assume as the reference point a situation where no mechanism is at work and where the policies of the countries under consideration are characterized by diversity (assumption 1).[1]

1 A number of further assumptions will be made in the course of the analysis. For the sake of clarity, all assumptions made in the text are listed in the annex.

2 Theoretical Expectations: Individual Convergence Mechanisms

Potential interaction effects between different convergence mechanisms can hardly be understood without knowledge about their individual effects on the degree and level of policy convergence. In the following, we thus develop hypotheses on the individual effects of regulatory competition, international cooperation, and transnational communication.

2.1 Regulatory Competition

From theories of regulatory competition (cf. Scharpf 1996, 1997; Vogel 1995; Holzinger 2003) several expectations about the convergence effects of this mechanism as well as its conditions of effectiveness can be derived. Regarding the degree of convergence, the basic expectation is that policy similarity across countries increases with the extent to which they are exposed to competitive pressures following from high economic integration (Drezner 2001, 59).

It follows from this argument that convergence effects can only be expected if two conditions are fulfilled. The first requirement is a country's exposure to international market pressures. In the absence of such pressures, no convergence will be observed. Lacking competitive pressures can either be the result of trade barriers or of lacking competition in or between non-market economies. In the latter case, which applies, for instance, to the Eastern European countries before 1990, even in constellations of high economic interaction and exchange, competitive pressures will remain very low.

Second, convergence effects will emerge only for those policies which affect competition among national industries. No convergence is predicted for policies subject to low competitive pressures from international markets. This holds true for all environmental policies that are not directly related to products or production processes, such as ambient quality standards, or nature protection. The same applies to trade-related policies if their effects on production costs are low.

Theories of regulatory competition imply that countries move their levels of regulation towards an equilibrium. As a consequence, there is full convergence only at the end of the process. During the process there is ever increasing convergence. If other convergence mechanisms become effective some time after the mechanism of regulatory competition, we assume increased but not yet full convergence (assumption 2).

There is an ongoing debate in the literature on the level of convergence caused by regulatory competition. In this context, a distinction is often made between product and production process standards (Scharpf 1996, 1997; Holzinger 2003). While for product standards, several factors might inhibit a race to the bottom and even trigger a race to the top, we find a widely shared expectation that policy convergence will occur at the lowest common denominator in the case of process standards.

In contrast to process standards, industries in both low-regulating and high-regulating countries have a common interest in harmonizing product standards to avoid the costs of market segmentation. Whether harmonization occurs at the level of high-regulating or low-regulating countries depends on a number of additional factors. Most important is the extent to which high-regulating countries are able to factually enforce stricter standards. If it is possible to erect exceptional trade barriers, as for example for health or environmental reasons under EU and WTO rules, convergence at a high level of regulation is likely (Scharpf 1997, 523; Vogel 1995). If such exceptional trade barriers cannot be justified, by contrast, competitive pressure is expected to induce governments to lower their environmental standards. Moreover, an upward move of regulatory levels can only be expected if the harmonization advantage is valued higher by business and governments than the cost difference between high and low levels of regulation (Holzinger 2003, 196).

In addition to these factors, a race to the top on product standards can be induced if national regulations serve as a certificate of superior product quality that is rewarded by the market. This constellation, in which national governments upgrade their own regulation to protect their firms against attractive, more highly regulated foreign competitors, seems to explain some aspects of the race to the top in international banking regulation (Kapstein 1994). There is limited evidence, however, for similar scenarios in the environmental field.

By contrast, none of these conditions avoiding downward pressures on national regulation is given for process standards. There are neither harmonization incentives to avoid market segmentations, nor do national governments have the opportunity to erect exceptional trade barriers. Hence, if the regulation of production processes increases the costs of products, regulatory competition will generally exert downward pressures on economic regulations (Scharpf 1997, 524).

For reasons of terminological simplicity, we use the term product standards only for those specific constellations in which product regulation is characterized by large harmonization advantages and the possibility to erect exceptional trade barriers, hence implying a race to the top. With process standards, by contrast, we refer to all constellations of (process and product) regulation characterized by the exclusion of exceptional trade barriers and/or the lack of harmonization advantages, hence leading to a race to the bottom.

Hypotheses: Regulatory Competition and Environmental Policy Convergence

1.1 Degree of Convergence

Policy convergence through regulatory competition increases with the extent to which countries are exposed to competitive pressures following from high economic integration.

1.2 Level of Convergence

Whenever there is a strict free trade regime, excluding exceptional trade barriers, there will be a decrease of both standard deviation and mean, irrespective of the type of regulation (race to the bottom).

In case of product regulation there will be a decrease of standard deviation but an increase of mean, given large harmonization advantages and the possibility of exceptional trade barriers (race to the top).

2.2 International Cooperation

The extent to which legal obligation emerging from international cooperation actually leads to the convergence of policies across countries is affected by a number of factors. First, it is obvious that convergence effects can only be expected amongst the member countries of the corresponding institution or regime with obligatory potential. At the same time, the obligatory impact of international institutions is likely only for policy areas in which they have in fact obligatory potential; i.e., the power to enact legally binding rules. To fulfill this condition it is thus not sufficient that a certain policy area falls under the jurisdiction of an institution with obligatory potential, but that the institution actually has obligatory powers in this policy area.

Another important factor influencing the degree of convergence is the type of harmonization used. Convergence effects are much stronger if policies rely on total or minimum harmonization of national regulations, hence significantly restricting the potential for domestic interpretations and deviations. The picture looks different, however, if policies are defined in a less rigid way. In this respect, varying techniques are conceivable, for example, differentiated regulatory requirements or mutual recognition. In these constellations, persisting diversity or divergence rather than convergence of national policies constitutes a plausible outcome.

These different techniques can be ranked in terms of their impact on the degree of cross-national convergence. Convergence effects will be most pronounced for total harmonization, followed by minimum harmonization, differentiated regulatory requirements and mutual recognition. Differentiated harmonization has similar effects as total harmonization. The only difference is that it cannot be expected to lead to full convergence. Mutual recognition as a technique of international cooperation has the same effects as regulatory competition alone. In the following, we develop hypotheses only for total and minimum harmonization, given their stronger effects on convergence.

In addition to the specific regulatory technique applied, the converging impact of legal requirements depends on the capacities of the international institution to enforce legally binding rules and, related to this issue, the actual compliance by the member states. For the following analysis we assume that there are no enforcement problems and all countries fully comply with international law (assumption 3).

Having elaborated on the conditions and degree under which international cooperation results in the convergence of national policies, we still have no information on the convergence level. With respect to legal obligation, the answer to this question basically depends on factors such as decision rules, interest constellations and the distribution of power between the involved actors (typically national governments) which shape the negotiations at the level of international institutions.

In light of this constellation, which might vary from case to case, it is difficult to develop general hypotheses on the conditions under which the negotiated agreement reflects a shift of mean towards either the top or the bottom. In principle, every result (most probably within the span of existing national regulations) is possible, depending on the dynamics of the international decision-making process. The literature generally predicts an outcome which reflects a compromise in the middle between countries favoring extreme positions of either rather strict or weak regulations (Drezner 2001, 61). Therefore, we assume that the level of harmonization will take place at the mean of the national regulation levels (assumption 4).

However, even if we assume that the final agreement reflects a compromise between high-regulating and low-regulating countries, we still need to know whether and in which direction the mean of national regulatory levels will change after a decision has been taken. Predicted mean changes are different for total and minimum harmonization.

In the case of total harmonization, the expected result is that convergence coincides with no mean changes of regulatory levels. The required upward and downward moves of national standards will neutralize each other, hence implying no departure of the mean from the original position. The constellation looks different, however, in case of minimum harmonization. Here it is still possible for countries with a preference for higher regulatory levels to enact standards beyond the minimum level specified in international agreements.

While deviations to the top are therefore still possible, countries with lower standards are obliged to raise their standards levels at least to the international minimum level. Minimum harmonization is thus likely to result in shifting the regulatory mean upward. This expectation rests on the assumption that not all high-regulating countries will lower their standards towards the minimum level (assumption 5).

Hypotheses: International Cooperation and Environmental Policy Convergence

2.1 Degree of Convergence

Policy convergence through international cooperation increases with the extent of integration of nation states into international institutions.

Policy convergence increases with the extent to which legal obligations require the harmonization of national policies.

2.2 Level of Convergence

If legal obligation requires the total harmonization of national standards, the level of convergence implies no significant changes of the mean.

If legal obligation requires the minimum harmonization of national standards, the level of convergence implies an upward shift of the mean.

2.3 Transnational Communication

Under which conditions do the mechanisms associated with transnational communication actually lead to cross-national policy convergence? It is obvious that this mechanism will be effective only for those countries and policies for which corresponding communication networks exist and in which the countries are actually represented.

What are the factors affecting the degree of policy convergence if this basic condition for the effectiveness of transnational communication is fulfilled? First, the potential that this mechanism drives the similarity of national policies increases with the density of information exchange within transnational networks (Simmons and Elkins 2003). This includes not only the frequency of interaction, but also the breadth of interaction; i.e., the functional differentiation of transnational networks. It is well-acknowledged in the literature that interaction density between states increases with their membership in international

institutions which strongly facilitate and intensify transnational information exchange (Bennett 1991, Haas 1992).

Second, convergence effects might increase with the extent to which policy transfer occurs between countries with strong cultural linkages. In their search for relevant policy models, decision-makers often look to the experiences of those countries with which they share an especially close set of cultural ties (Rose 1991; Strang and Meyer 1993). Especially in constellations characterized by high uncertainty about the consequences of policy choices, decision-makers are likely to imitate the practices of nations with which they share linguistic, religious, historical or other cultural linkages (Friedkin 1993; Simmons and Elkins 2003).

Under which condition does transnational communication lead to an upward or downward shift of convergence levels? To answer this question, the different mechanisms linked to transnational communication can be divided into two subgroups, namely policy copying and benchmarking.

Under policy copying, we summarize the mechanisms of emulation and learning. This can be justified by the fact that in reality it will hardly be possible to decide whether the adoption of similar policies was the result of simple imitation or deliberate lesson-drawing (Bennett 1991). In the case of copying, no predictions about the level of convergence are possible. The fact that other states adopt a certain innovation or copy policy concepts successfully applied in other countries does not automatically imply that this results in an increase in regulatory levels. It might well be the case that states adopt less demanding regulations, following corresponding patterns in other countries (e.g. replacing of interventionist regulation by self-regulation). The range of possible convergence levels thus encompasses the whole range of regulation levels given in the involved countries.

The picture is less open if transnational communication is directed at the promotion of policy models by benchmarking activities of international organizations. As a result of the competition of ideas emerging from the dissemination and evaluation of best practice, benchmarking can be expected to result in an overall strengthening of regulatory concepts; hence inducing an upward shift of the mean. Since international organizations will generally promote the most progressive national approach, we assume that the benchmark will be set at the level of the highest-regulating country (assumption 6). Notwithstanding the dynamics underlying the promotional activities of international organizations, however, the voluntary nature of this approach should not be overlooked. As a consequence, we assume that only some countries will move their regulatory levels to the benchmark, while others will stick to their existing regulations (assumption 7).

Hypotheses: Transnational Communication and Environmental Policy Convergence

3.1 Degree of Convergence

The extent to which the exchange of knowledge in transnational networks results in cross-national policy convergence increases with the density of interaction and cultural linkages among the involved states.

3.2 Level of Convergence

If exchange of knowledge in transnational networks is based on policy copying, the level of convergence might imply either no mean change or an upward or downward shift of the mean.

If exchange of knowledge in transnational networks is based on benchmarking, the level of convergence implies an upward shift of the mean.

3 Theoretical Expectations: Interaction Effects

In the following, we develop hypotheses on the interaction effects of the three convergence mechanisms. We first delineate the scope of effectiveness for the interaction of several factors and then formulate hypotheses on the degree and level of convergence. The interaction analysis pursues the aim of comparing situations where no mechanism is effective to situations where both or all three mechanisms interact. In some cases the consequence of the interaction depends on the sequence in which the mechanisms become effective. Therefore we analyze the interactions in a sequential mode: We start from the situation where no mechanism is at work. Then we sequentially introduce mechanism 1, mechanism 2, and in case of triple interaction mechanism 3. Next, we change the sequence, introducing first mechanism 2, second mechanism 1, and so forth.

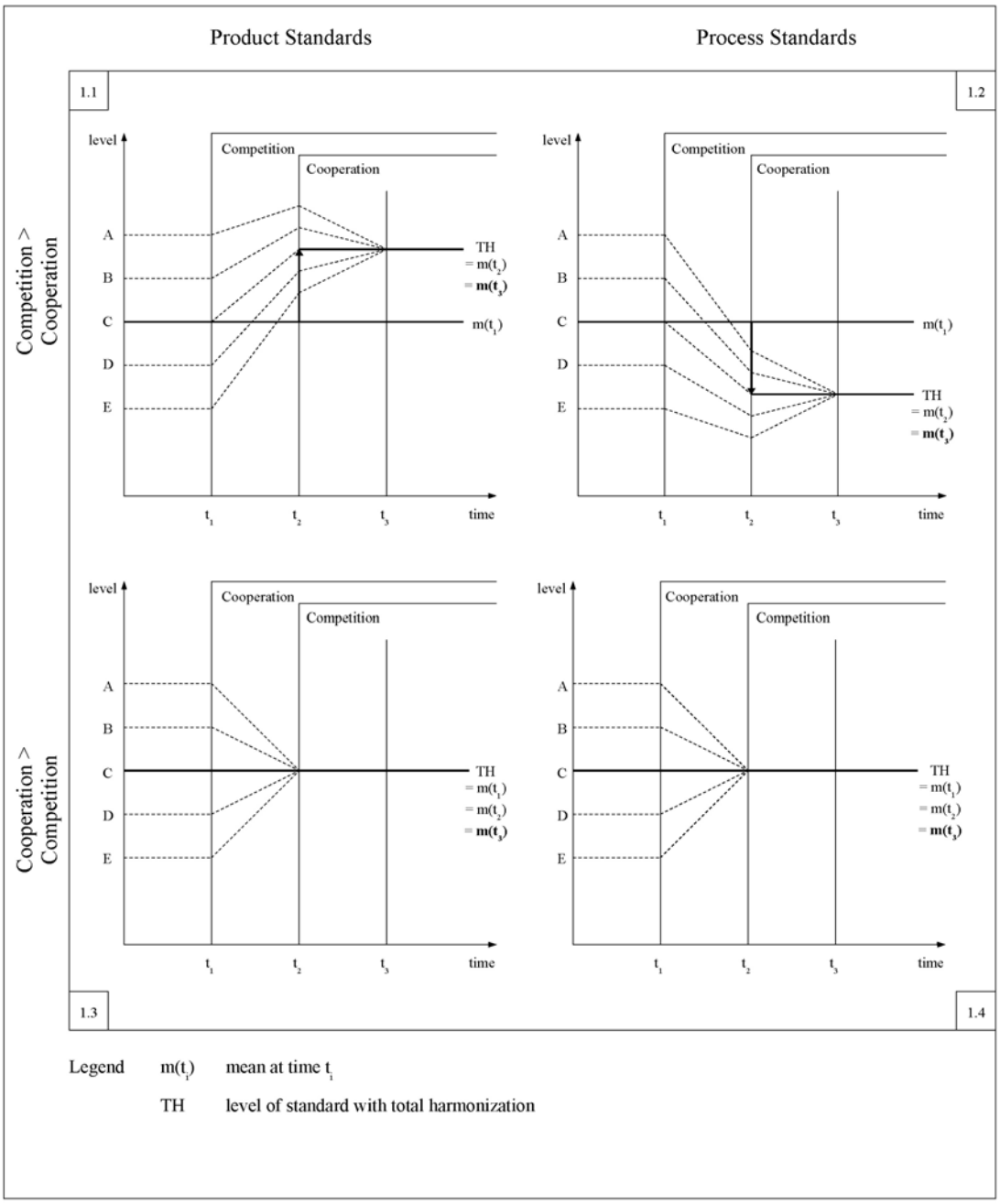
3.1 Interaction of Competition and Cooperation

The interaction of regulatory competition and international cooperation limits the scope of effectiveness to countries which are members of international organizations with obligatory potential and which belong to a common market. Moreover, interaction will be effective only for those policies for which the international organization has the power to enact binding international law and which affect the competitive position of national industries. This is true for the binding international standards for products and production processes.

The interaction effects of cooperation and competition depend on the type of legal harmonization used, total or minimum harmonization. With total harmonization, international cooperation dominates regulatory competition. Whenever total harmonization is agreed upon, regulatory competition cannot develop or it will stop. Therefore, the interaction of both mechanisms leads to full convergence at the level of harmonization. The level of convergence, however, depends not only on the type of policy – product or process regulation – but also on the sequence of interaction.

The graphical representations in Figure 1 depict three cases of changes in standard deviation and mean. We first assume that after an initial phase of diversity of countries' policies (t_1), the mechanism of regulatory competition starts working (t_1 to t_2), and after some time international cooperation takes place (t_2 to t_3). The mean in t_1 is given by the median country, as for simplicity the regulatory distance between the countries is assumed to be equal in the graphical illustrations (assumption 8).

Figure 1: Competition and Total Harmonization



What happens to the standard deviation and the mean in case of product regulation (Figure 1.1)? While both remain constant in the first phase, after t_1 the standard deviation decreases, whereas the mean increases from t_1 to t_2 (race to the top). In t_2 an international agreement is concluded which totally harmonizes the product standard. Following assumption 4, harmonization takes place at the mean in t_2. Thus, in the next phase standard deviation decreases to zero as a result of harmonization (full convergence at the standard), implying that the level of the mean from now on is the same as the level of the standard. Therefore, the interaction leads to full convergence and an upward shift of the mean from m (t_1) to m (t_2), which is at the same time m (t_3). For production standards the process and the result are similar. The only difference is that regulatory competition in this case drives the mean downward before total harmonization becomes effective (Figure 1.2).

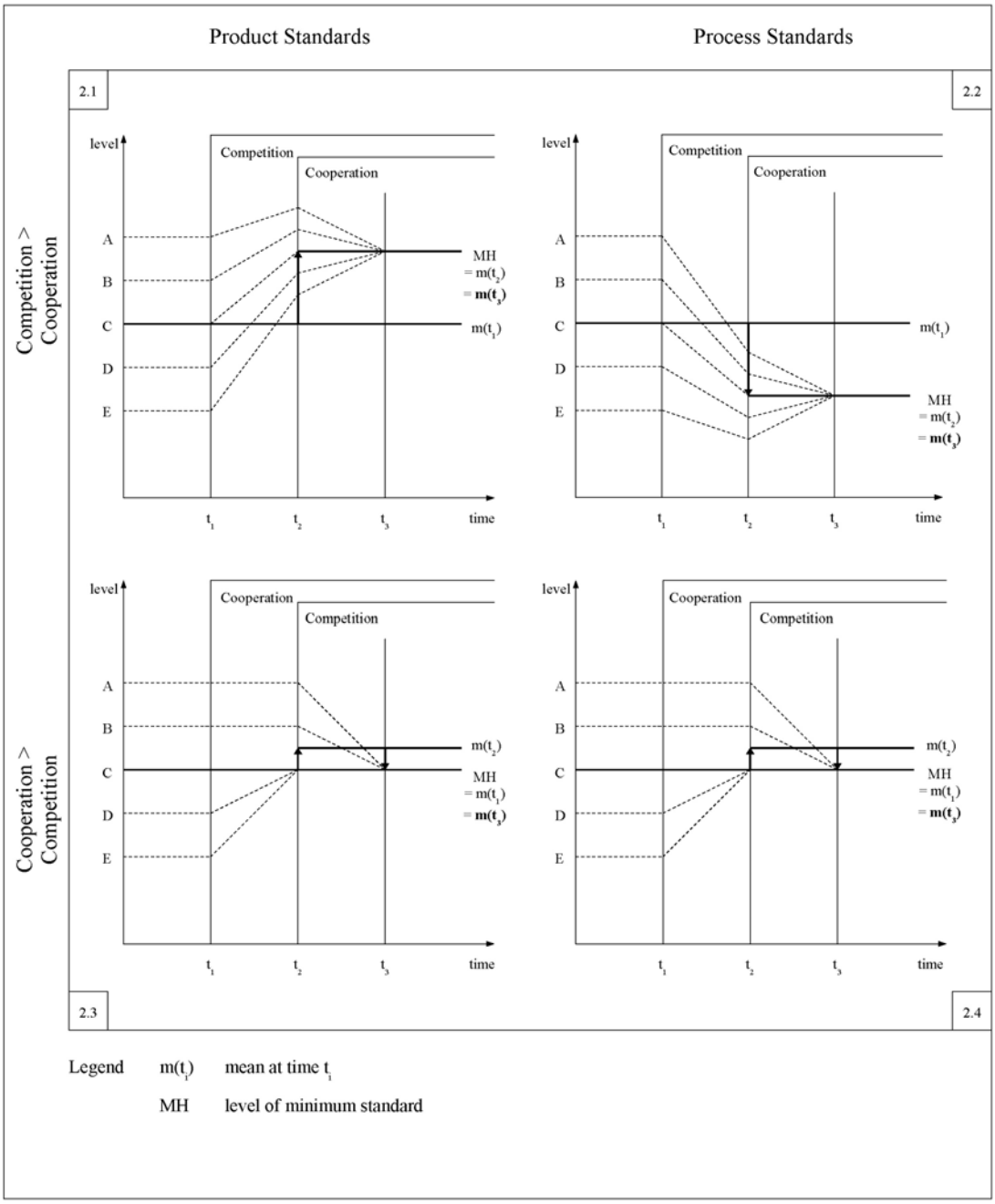
What happens when total harmonization were to become effective before regulatory competition? This scenario does not make much sense, as total harmonization supersedes regulatory competition. This sequence implies however, that the level of convergence is different than in the two cases described above. Total harmonization takes place at the mean m (t_1) of countries' positions in the initial phase. All countries converge to this level and stay there, as they are not permitted to deviate. There is no shift of the mean upward or downward in this scenario, and there is no difference between product or process standards (Figures 1.3 and 1.4).

In contrast to total harmonization, the isolated effect of minimum harmonization does not lead to full convergence of policies. Cooperation does not fully replace competition. In this case the two factors truly interact. Again, however, the type of standard and the interaction sequence lead to different levels of convergence. The four cases are represented in Figure 2.

We start with the assumption that regulatory competition is at work (t_1) before international cooperation leads to the setting of a minimum standard (t_2). In the case of product standards, regulatory competition will lead to a decrease of standard deviation and an increase of the mean level of regulation (hypothesis 1.2). In t_2 minimum harmonization is introduced at the current mean. Legal obligation causes countries with policies below the mean to raise their standards to the minimum standard level. Countries with regulations above the minimum standard are not obliged to lower their standard levels. There is a high probability, however, that they do so. This can be traced to the fact that – as soon as minimum standards are established – high-regulating countries are no longer permitted to erect exceptional trade barriers on the ground that products from low-regulating countries complying with the minimum standard constitute a threat to national health. Assuming that stricter product standards coincide with higher production costs and hence competitive disadvantages, high-regulating countries have a strong incentive to reduce their regulations to the level of the minimum standard. Thus, full convergence at the level of the minimum standard occurs. Regulatory competition shifts the mean upward from m (t_1) to m (t_2), cooperation fixes the

mean at m (t_2) as the minimum standard, and finally, cooperation and competition drive all countries towards the minimum standard, such that mean and minimum standard become identical at m (t_3) (Figure 2.1).

Figure 2: Competition and Minimum Harmonization



In the case of process standards the development is similar (Figure 2.2). Again, the difference is solely that regulatory competition in the first phase leads to a shift of the mean downward, and thus the minimum standard will be set at a lower level. After minimum harmonization, all countries converge to the standard level, some because they are obliged to raise their standards, others because regulatory competition exerts a downward pressure on process standards (hypothesis 1.2).

What happens if the sequence is changed and minimum harmonization is effective before regulatory competition? We start again with product regulation (Figure 2.3). After a phase of diverse policies, international cooperation introduces a minimum standard in t_1. As usual, the standard level is the mean ($m(t_1)$). There is no full convergence, as national standards above the minimum standard are permitted. Assuming that some countries keep their higher standards, the mean shifts upward to $m(t_2)$. In t_2 regulatory competition becomes effective and drives the countries which apply higher standards towards the minimum standard, as they want to enjoy the harmonization advantage. As a consequence, the mean $m(t_2)$ falls back on the minimum standard level ($m(t_1)$). Thus, there is no overall upward shift of the mean. Compared to both the isolated effects of minimum harmonization and the opposite sequence of interaction the mean is lower.

Finally, what happens in the case of regulation of production processes if minimum harmonization is effective before regulatory competition (Figure 2.4)? As with product regulation, the minimum standard leads to some but not full convergence and it raises the mean level of standards to $m(t_2)$. Regulatory competition drives the countries with stricter regulation towards the minimum standard, as a consequence of the downward competitive pressure (hypothesis 1.2). Therefore, the picture is exactly as with product standards. After an intermediary raise of the mean above the minimum standard to $m(t_2)$, it falls back to $m(t_1)$. Compared to the isolated effects of minimum harmonization the mean level is lower, but compared to the opposite sequence of interaction the mean level is higher.

The interaction of competition and minimum harmonization constrains the positive effects of minimum standards and of regulatory competition in the case of product standards, as it implies an upper limit at the level of the minimum standard. In the case of process standards, the interaction of both effects provides a lower limit to regulatory competition at the level of the minimum standard. Thus, given the interaction of cooperation and competition, the effects of total and minimum harmonization do not differ. Minimum harmonization is factually equivalent to total harmonization.

Interaction Hypotheses: Competition and Cooperation

4.1 Degree of Convergence

The interaction of international cooperation and regulatory competition leads to the full convergence of national policies, irrespective of the type of harmonization, the type of policy, and the sequence of interaction.

4.2 Level of Convergence

Whenever international cooperation becomes effective before regulatory competition, the mean remains at the initial level, irrespective of the type of harmonization.

Whenever regulatory competition is effective before international cooperation and product standards are concerned, the mean regulatory level rises compared to the initial level.

Whenever regulatory competition is effective before international cooperation and process standards are concerned, the mean regulatory level declines compared to the initial level.

3.2 Interaction of Competition and Communication

Interaction effects of regulatory competition and transnational communication are restricted to those countries which are *both* integrated economically (as members of a common market) and interlinked into transnational communication networks. Moreover, interaction effects are only relevant for those policies which affect the competitive position of these countries.

In developing hypotheses on the interaction effects of regulatory competition and transnational communication, we first differentiate between policy copying (no clear linkage between convergence mechanisms and convergence level) and benchmarking (upward shift of the regulatory mean). Second, for both constellations we distinguish between process and product standards, given their different effects on convergence levels. Third, following hypothesis 3.1, we base our analysis on a distinction between countries among which convergence effects as a result of transnational communication are more or less likely (given different degrees of cultural interlinkages).

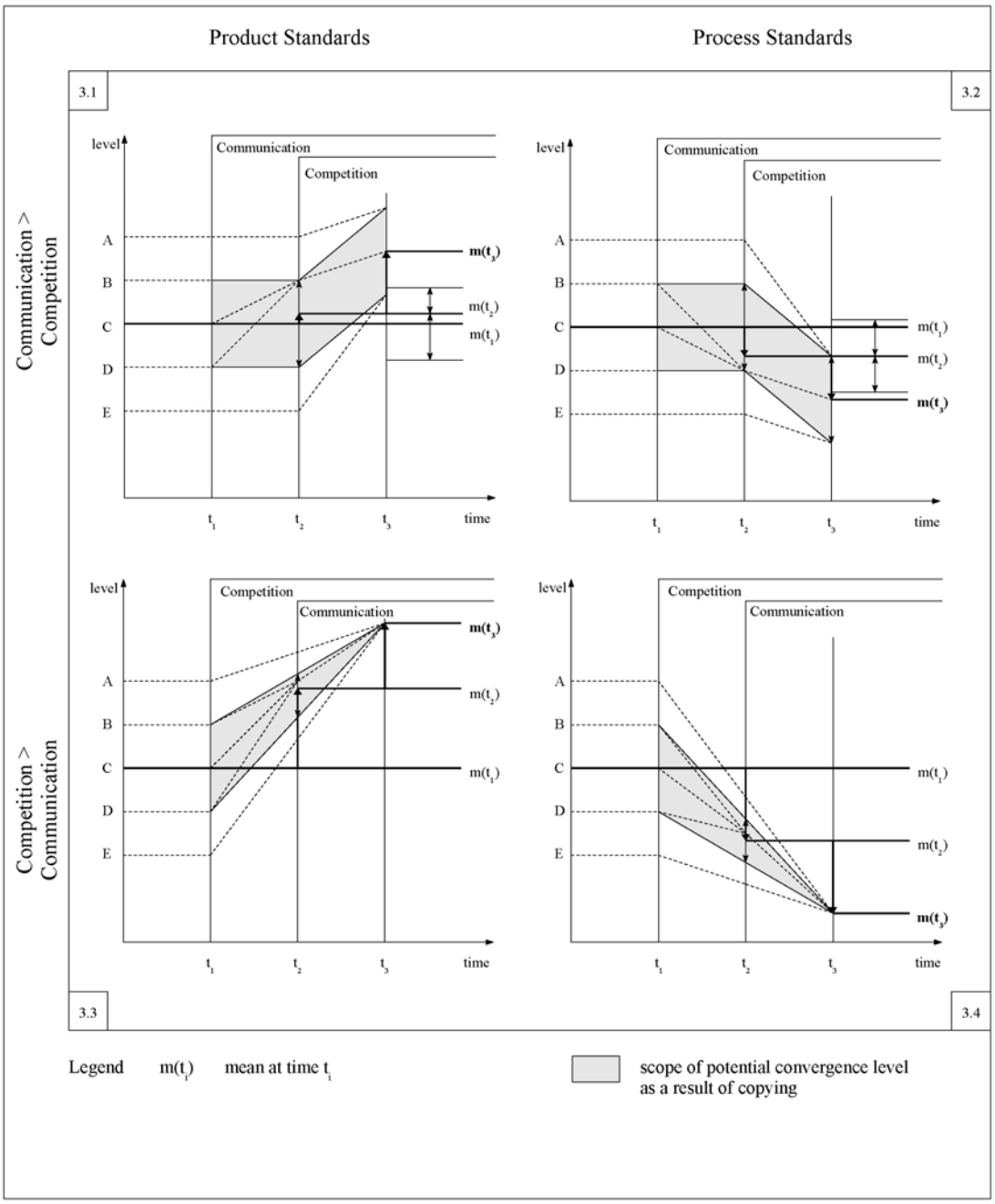
Figure 3 shows the interaction effects for competition and copying. Three countries (B, C, and D) are assumed to have close cultural linkages. We assume that for these countries,

policy copying is very likely. As it is impossible to theoretically predict the concrete level at which convergence through copying takes place, we have illustrated the potential bandwidth of convergence levels by grey hatching. To set an example, we have selected a possible convergence point within this bandwidth.

Regardless of the interaction sequence of competition and communication, we expect that both mechanisms mutually strengthen each other with respect to the degree of policy convergence. Policy convergence as a result of transnational communication is overlapped by similar effects of regulatory competition. Countries characterized by strong communicative convergence effects will either move simultaneously (in cases where communication precedes competition) or converge faster than other countries (in cases where competition precedes communication) towards either the top or the bottom, as implied by regulatory competition (Figure 3).

Implicit to this argument is thus the expectation that the extent to which the interaction of both mechanisms implies an upward or downward shift of the mean is basically affected by regulatory competition rather than policy copying. This statement follows from the above differentiation between countries where convergence effects, as a result of transnational communication, are more or less pronounced. Policy convergence and hence the reduction of regulatory competition between some countries does not exclude that these countries are still exposed to competition from other countries where transnational communication has no effect on existing regulatory diversity. Hence, it makes no difference which level of convergence between the affected countries is implied by transnational communication. The major determinant of the convergence level stems from the effects of regulatory competition.

Figure 3: Competition and Copying



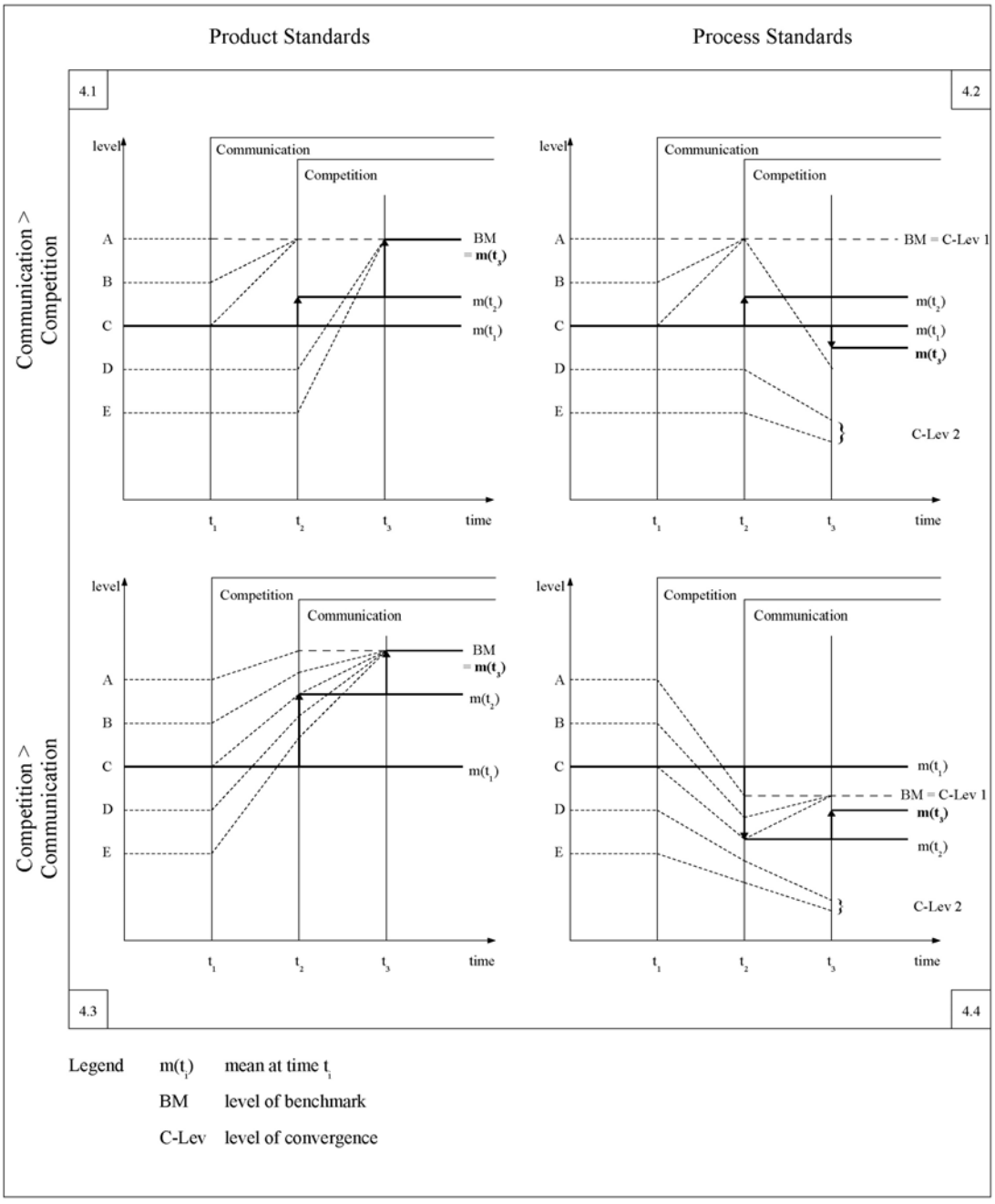
This is no longer the case, however, if the impact of transnational communication rests on benchmarking. In contrast to policy copying, this mechanism is expected to result in an upward shift of the regulatory mean. Considering the interaction of benchmarking with regulatory competition, we arrive at rather different expectations in terms of both the degree and level of convergence. As is illustrated in Figure 4, these differences emerge not only from the mean shift implied by regulatory competition, but also from the interaction sequence between both mechanisms.

In Figure 4.1 benchmarking precedes regulatory competition and regulatory competition on product standards implies an upward shift of the mean. In the first phase, benchmarking is expected to lead to policy convergence at a higher level. As not all states will move towards the benchmark (assumption 7), m (t_2) is expected to lie somewhere in between the level of the benchmark and m (t_1). It is only as a result of regulatory competition that we can expect a further upward mean shift toward the benchmark. This can be traced to the harmonization advantages associated with uniform product standards; hence there is an incentive for all states to adopt a common standard, as defined by the benchmark. In this case, regulatory competition will not only lead to an upward shift of the mean, but also further increase the degree of cross-national convergence.

Expected results are only slightly different if regulatory competition precedes benchmarking (Figure 4.3), with the main variation being an even higher convergence level. Regulatory competition in the first place leads to convergence and an upward shift of the mean. Consequently, subsequent benchmarking occurs at a higher level than in the first sequence, because even high-regulating states will have further increased their regulation levels in the context of competitive pressures. At the same time, harmonization advantages of uniform product standards are expected to yield full convergence at the level of the benchmark.

The expected results will differ, however, if regulatory competition implies a race to the bottom. In Figure 4.2 benchmarking is combined with subsequent competition on process regulation. In this case, the final convergence level depends on the relative impact of countervailing pressures emerging from benchmarking and economic competition. While some states (most probably those for which competitive effects are less pronounced) will move towards the benchmark, other countries will enter a race to the bottom. The concrete balance of these forces is difficult to predict. Although it is rather likely that regulatory competition will imply that m (t_3) moves below m (t_2), the extent to which m (t_3) lies even below m (t_1) is affected by the number and extent to which states move toward the benchmark or the bottom. This way, two convergence levels (benchmark and bottom) are predicted. Albeit not leading to full convergence, regulatory competition thus increases the overall policy similarity across countries, at least when compared to the initial constellation. On the other hand, the emergence of two levels implies a lower degree of convergence, as could be expected from the mere impact of regulatory competition.

Figure 4: Competition and Benchmarking



Two convergence points, albeit at lower levels, are also predicted if regulatory competition precedes benchmarking activities (Figure 4.4). Since regulatory competition implies a convergent move towards a lower regulatory level, the benchmark will be set at a lower level, as it would be the case if regulatory competition was not effective. Assuming again that some states move to the benchmark while others converge at the bottom, this scenario implies that convergence coincides with a downward shift of the mean; i.e., m (t_3) lies below m (t_1).

Interaction Hypotheses: Competition and Communication

5.1 Degree of Convergence

The interaction of regulatory competition and transnational communication leads to increased convergence of national policies, irrespective of the sequence of interaction and the mechanisms underlying transnational communication.

5.2 Level of Convergence

The interaction of regulatory competition and transnational communication leads to an upward shift of the regulatory mean whenever the isolated impact of regulatory competition drives into this direction, irrespective of policy type and sequence of interaction.

If regulatory competition implies a move to the bottom and communication effects emerge from benchmarking, convergence will occur at two points, irrespective of the sequence of interaction of the mechanisms. In all other constellations, full convergence is expected.

The interaction of regulatory competition and transnational communication reduces the potential of a downward shift of the regulatory mean whenever the isolated impact of regulatory competition drives into this direction and communication effects emerge from benchmarking. This potential increases when transnational communication is effective before regulatory competition.

3.3 Interaction of Cooperation and Communication

Interaction effects of international cooperation and transnational communication will only be observed for countries that are members of both international institutions with obligatory potential and transnational communication networks. Moreover, interaction effects are

restricted to policies for which international institutions have obligatory potential and which at the same time are discussed in transnational networks.

The theoretical assessment of interaction effects of cooperation and communication is based on two analytical distinctions. First, effects differ with the extent to which legal obligation implies total or minimum harmonization. Second, the convergence level is also affected by the extent to which the relevant mechanism underlying transnational communication is based on benchmarking (implying an upward mean shift) or policy copying (where the direction of mean change is open).

The possible constellations for the case of total harmonization are summarized in Figure 5. In all constellations, total harmonization implies the full convergence of national policies to the level defined in international legislation. The scenarios differ, however, with respect to potential mean changes induced by cooperation. No changes of the initial mean m (t_1) are expected if cooperation is effective before communication (Figures 5.1 and 5.2). Subsequent benchmarking or copying will have no additional effect, as all countries have already switched to similar policy models.

The situation differs, however, if communication precedes cooperation (Figures 5.3 and 5.4). The effectiveness of communication mechanisms before cooperation might imply that national levels of regulation shift as a result of benchmarking or copying; hence leading to a mean shift in t_2. Consequently, subsequent harmonization will occur at another level than in the initial constellation. In the case of benchmarking, this will induce an upward shift of the mean (Figure 5.3), while for copying, no clear statement is possible (Figure 5.4). Depending on the effects of communication, all outcomes in the range between the highest and lowest level of initial national regulation are conceivable. To set an example, a possible convergence point was selected in Figure 5.4.

Figure 5: Total Harmonization and Communication

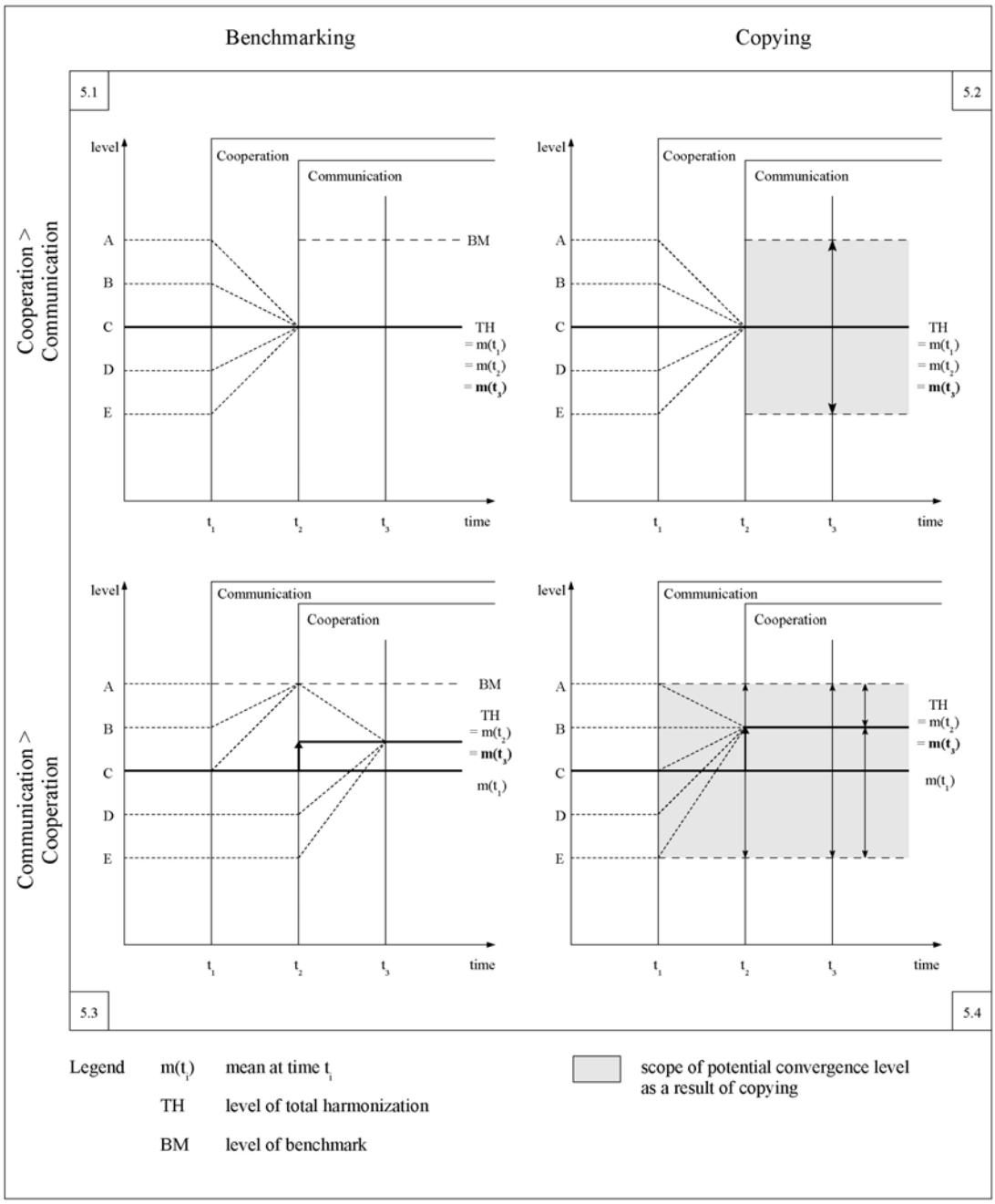
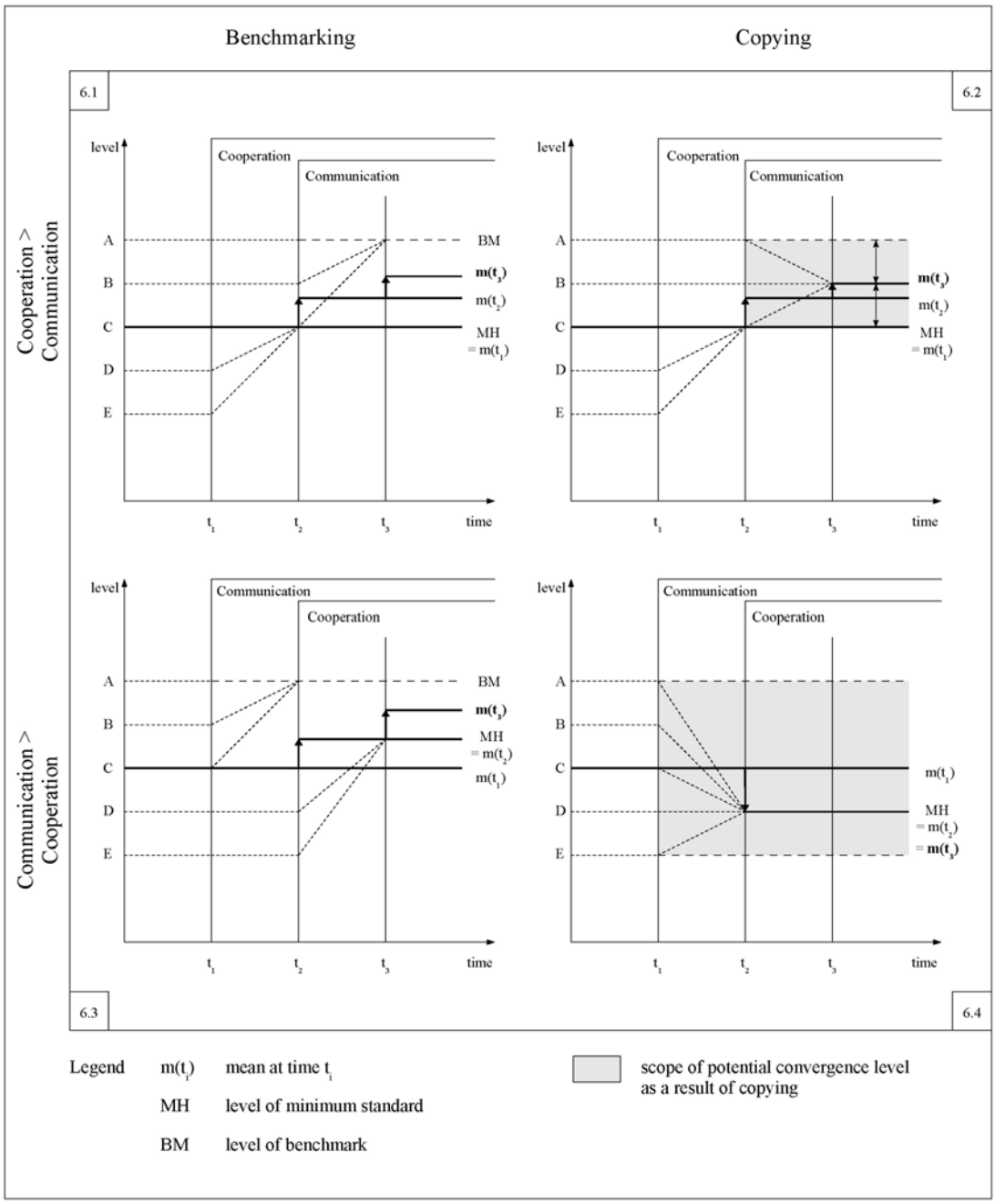


Figure 6 illustrates the interaction effects in the case of minimum harmonization. In contrast to total harmonization, the combination of cooperation and communication yields increased, but not full convergence of national policies. In terms of convergence levels, however, the interaction of both mechanisms bears a higher potential for upward moves, as it is the case for total harmonization. This is most apparent in the cases where cooperation interacts with benchmarking. Regardless of the interaction sequence, we predict a twofold upward shift of the mean. If cooperation precedes communication (Figure 6.1), the first upward move emerges from minimum harmonization at the level of the initial mean. While all states below the standards will have to move upwards, some high-regulating countries will remain above the minimum level; implying that m (t_2) lies above m (t_1). As subsequent benchmarking occurs at the highest national level and some, but not all countries will move towards the benchmark (see assumptions 6 and 7), a second increase of the mean is predicted, with m (t_3) lying between the benchmark and m (t_2). The same pattern, albeit in a different sequence, is expected if communication becomes effective before cooperation (Figure 6.3).

If transnational communication is based on copying, however, clear statements about expected mean changes are impossible. Whenever communication precedes cooperation, the scenario is similar to total harmonization; all outcomes between the highest and lowest level of initial national regulation are conceivable (Figure 6.4). The range of potential outcomes is reduced, however, in the case of the opposite sequence (Figure 6.2). Depending on the specific effects of copying, the minimum standard set at the initial mean m (t_1) marks the lowest possible level, while the regulatory level of the highest regulating country marks the other end of the spectrum. Upward mean shifts are thus rather likely, as any moves below m (t_1) are excluded by the minimum standard.

Figure 6: Minimum Harmonization and Communication



Interaction Hypotheses: Cooperation and Communication

6.1 Degree of Convergence

The interaction of international cooperation and transnational communication leads to full convergence if legal obligation is based on total harmonization, irrespective of the sequence of interaction and the mechanisms underlying transnational communication.

The interaction of international cooperation and transnational communication leads to increased, but not full convergence if legal obligation is based on minimum harmonization, irrespective of the sequence of interaction and the mechanisms underlying transnational communication.

6.2 Level of Convergence

The interaction of international cooperation and transnational communication is more likely to lead to an upward shift of the regulatory mean if cooperation is based on minimum rather than total harmonization.

The interaction of international cooperation and transnational communication is more likely to lead to an upward shift of the regulatory mean if communication is based on benchmarking rather than policy copying.

3.4 Interaction of Competition, Cooperation and Communication

The interaction of all three convergence mechanisms, regulatory competition, international cooperation, and transnational communication, is effective for all countries which belong to a free trade area, which are members in international organizations with obligatory potential, and which are members in transnational communication networks. The scope of effectiveness of the interaction of all factors includes those policies which affect the competitive position, for which international organizations have obligatory potential, and which are discussed in transnational communication networks.

For three mechanisms there are six distinct sequences of interaction. For each factor two sub-classes were distinguished which make a difference for the result: product and process standards for regulatory competition, total and minimum harmonization for international cooperation, copying and benchmarking for transnational communication. As a consequence there are 48 cases where the triple interaction might lead to different results. However, most

of these cases need not be analyzed in detail, as they yield results which were already discussed in the context of the interaction of two factors.

This is valid especially for the case of total harmonization. The 24 cases where total harmonization is involved can be omitted as the results of these combinations were already discussed:

- First, whenever total harmonization becomes effective before regulatory competition or transnational communication, the other mechanisms have no effect at all. Thus, the isolated effects of total harmonization apply (see hypothesis 2.1).

- Second, whenever total harmonization comes in the middle between the other two mechanisms, the last mechanism has no effect, and total harmonization fixes the effect of the first factor. Thus, the isolated effects of the first mechanisms apply (see section 3).

- Third, whenever total harmonization comes last, it fixes the interaction effects of regulatory competition and transnational communication. Thus, the analysis of this interaction applies (see section 4.2).

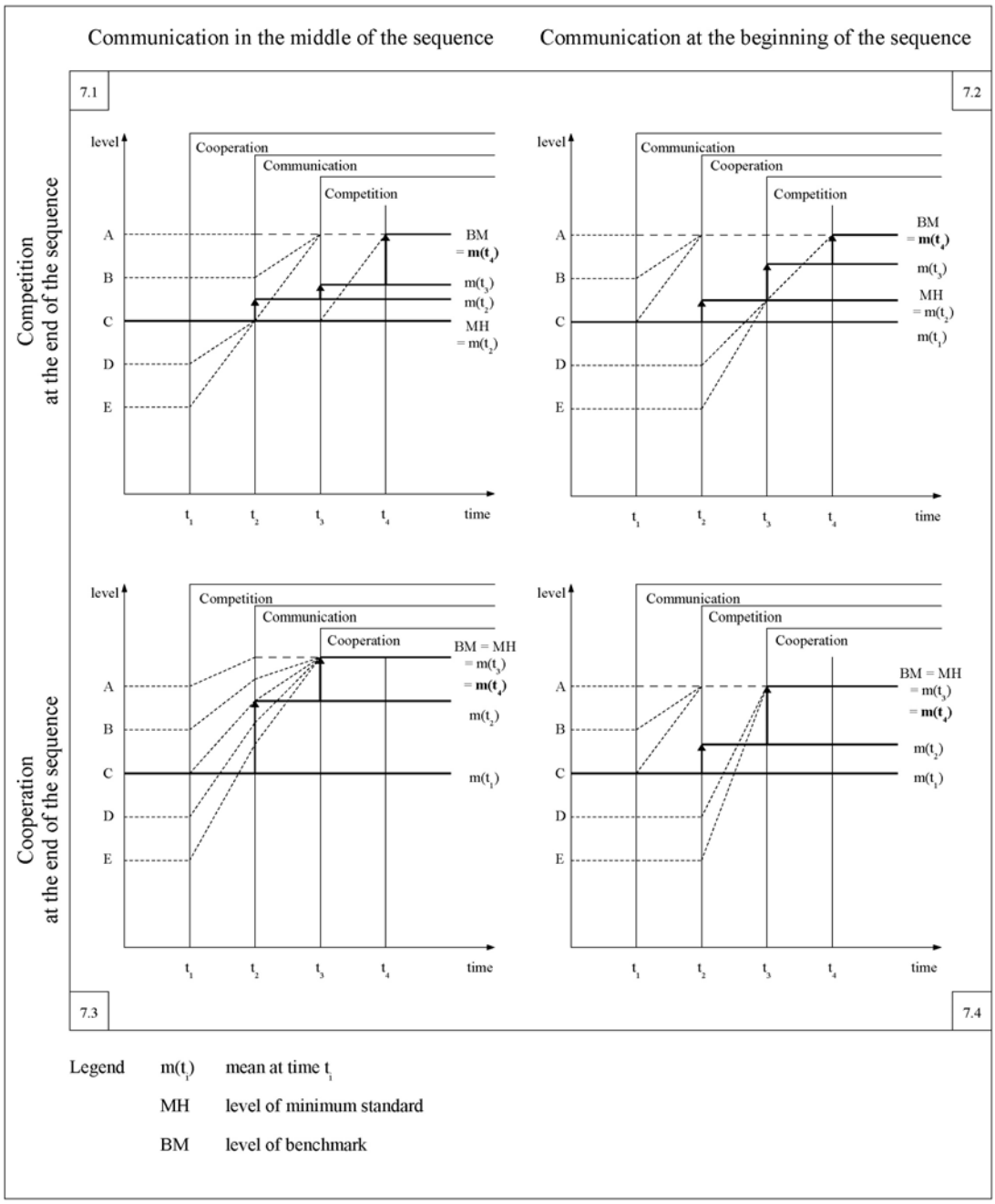
This leaves us with the 24 cases where cooperation takes the form of minimum harmonization. Two sequences can be immediately excluded, namely the ones where transnational communication becomes only effective after the other two mechanisms. In these eight cases, communication has no effect. This is due to the fact that the interaction of regulatory competition and minimum harmonization leads to factual total harmonization (section 4.1 above). Thus, there is already full convergence and neither copying nor benchmarking will lead to a shift of the mean. The results of the interaction of regulatory competition and minimum harmonization are decisive.

For the remaining 16 cases, where transnational communication is the first or second mechanism to become effective, again some can be excluded from the discussion, namely those where communication takes the form of copying. Whenever copying appears in a sequence with regulatory competition, it does not affect the result, as competition is stronger. This happens irrespective of the sequence of competition and copying (see section 4.2 above). Therefore, communication has no effect here, as well. Moreover, the interaction of regulatory competition and of minimum harmonization leads to factual total harmonization (see section 4.1). This argument applies to three sequences, which include six cases, as for regulatory competition product and process standards must be distinguished.

As far as copying is concerned, we are left with one sequence and two cases: the sequence starts with copying, followed by minimum harmonization and regulatory competition, either for product or for process standards. Since copying can lead to convergence at any level of regulation within the lowest and highest national regulatory levels, we cannot predict here at which level minimum harmonization takes place (see section 4.3). Whatever the level is, however, countries will converge to what later becomes the minimum standard. Regulatory competition does not affect this result. In case of product standards, the harmonization advantage causes the countries to keep their regulation at the minimum level; in case of process standards, legal obligation and downward market pressures drive them to the minimum level (see section 4.1). There is convergence to the minimum standard, but we do not know at which level of regulation.

We are now left with 8 cases where minimum harmonization and benchmarking interact with regulatory competition. The cases are distinct with respect to the sequence of interaction and the type of standards, product or process, regulatory competition refers to. We start with product standards.

Figure 7: Product Standards, Minimum Harmonization and Benchmarking

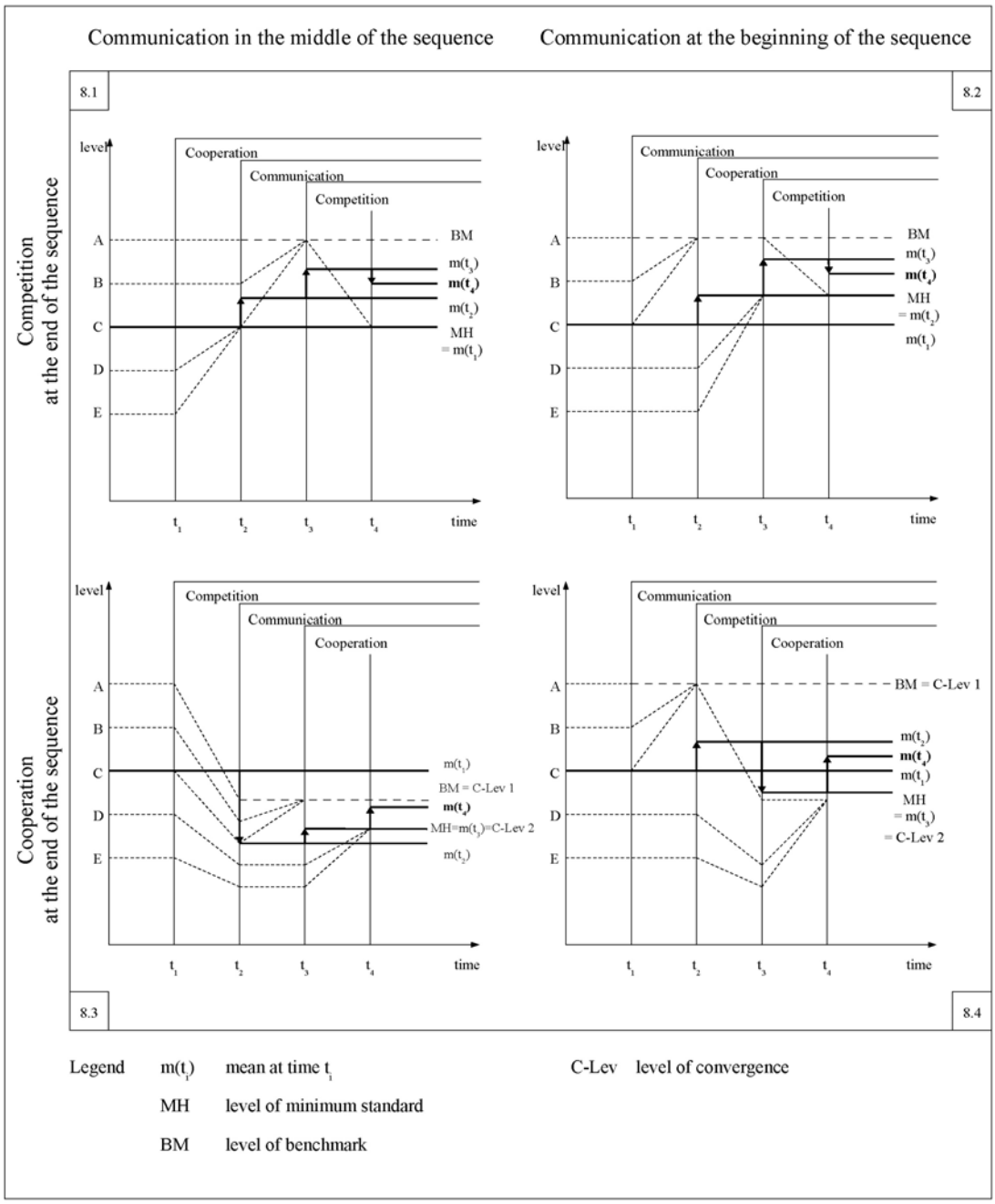


In Figure 7.1 the interaction sequence starts with minimum harmonization, followed by benchmarking and regulatory competition. The minimum standard is set at the mean in t_1, which drives the mean upward to m (t_2). The benchmarking process starting in t_2 shifts the mean further upward to m (t_3). Finally, regulatory competition is likely to induce all countries to raise their levels of product standards to the benchmark. This is the result of the harmonization advantage. Thus, the mean in t_4 is at the benchmark, that is, at the highest level of national regulations.

The interaction of cooperation, communication, and competition in case of product standards leads to full convergence at the benchmark or top regulatory level. This implies that there is a clear upward shift of the mean level of regulation. These results hold true for all possible sequences of interaction of minimum harmonization, benchmarking, and competition for product standards. As Figure 7 shows, only the speed of convergence and the course of the mean shifts differ with the sequences.

The picture is different in case of process standards. We start again with the sequence where minimum harmonization is followed by benchmarking before regulatory competition occurs (Figure 8.1). As with product standards, the minimum standard is set at the mean in t_1. The mean is driven upward first by cooperation (m (t_2)) and second by benchmarking (m (t_3)). Next, however, competition drives the mean down. As developed in section 4.2, there will be two points of convergence in this scenario. Some countries will lower their standards to the minimum standard as a result of market pressures, whereas others might keep their standards at the level of the benchmark. The mean is thus somewhere between the minimum standard and the mean before the mechanism of competition became effective (m (t_3)). As the minimum standard is at the level of m (t_1), the mean either remains or shifts upward. This combination of factors is therefore relatively effective in setting a lower limit to regulatory races to the bottom.

Figure 8: Process Standards, Minimum Harmonization and Benchmarking



In Figure 8.2, the sequence of minimum harmonization and benchmarking is reversed. In this case, benchmarking will shift the mean upward in a first step (m (t_2)), and minimum harmonization will do so in a second step (m (t_3)). The minimum standard is set at m (t_2) As in the previous case, regulatory competition drives the mean down again. At the end the mean is between m (t_3) and the minimum standard. There is no full convergence, as some countries apply standards at the benchmark level while others apply the minimum standard. Compared to the initial situation the mean shifts upward, as the minimum standard lies above m (t_1). Thus, whenever the benchmark is "secured" by an obligatory minimum standard, an upward shift of the mean is possible despite the race to the bottom induced by competition.

What happens when minimum harmonization takes place last? The first case is the one where the process starts with regulatory competition (Figure 8.3). Market pressures cause countries to lower their standards. There is partial convergence and the mean shifts downward to m (t_2). On this basis, benchmarking is less effective than in the cases just discussed. The benchmark is the highest national standard, which might lie below or above the original mean (m (t_1)). Still the benchmarking process shifts the mean upward to m (t_3), as some states will follow the benchmarking country. This mean is fixed by minimum harmonization in the next step. As some countries remain at the benchmark, however, minimum harmonization is not equivalent to total harmonization in this scenario. The final mean (m (t_4)) is above the minimum standard but it is likely to lie below m (t_1). There is no full convergence here, and compared to the initial stage the mean is likely to remain the same or to shift downward.

Finally, in Figure 8.4 the process starts with benchmarking, which shifts the mean to m (t_2). Regulatory competition drives the mean down again, however, as some countries remain at the benchmark, m (t_3) is considerably above the bottom line. Minimum harmonization fixes m (t_3) and draws some countries upward by obligation. The new mean (m (t_4)) is above the minimum standard as a result of benchmarking. It will be around the original mean (slightly above m (t_1) in the figure). Again, there are two points of convergence, the benchmark and the minimum standard. Thus, whenever competition occurs in early stages of the interaction sequence, benchmarking and minimum standards are less effective, as these mechanisms start then from a lower regulatory basis.

The triple interaction of regulatory competition, transnational communication, and international cooperation can lead to many different outcomes. Most of them are identical with the outcomes of isolated mechanisms or with the outcomes of the interaction of two mechanisms. The triple interaction leads to distinct results only if cooperation takes the form of minimum harmonization and if the communicative mechanisms is benchmarking.

Interaction Hypotheses: Competition, Cooperation and Communication

7.1 Degree of Convergence

Triple interaction of minimum harmonization, benchmarking, and regulatory competition leads to full convergence of regulation if product standards are concerned.

7.2 Level of Convergence

Triple interaction of minimum harmonization, benchmarking, and regulatory competition leads to two points of convergence, one at the minimum standard, and one at the benchmark, only if standards for production processes are concerned.

Triple interaction of minimum harmonization, benchmarking, and regulatory competition leads to a clear upward shift of the mean to the top or benchmark level if product standards are concerned.

Triple interaction of minimum harmonization, benchmarking, and regulatory competition is likely to lead to an upward shift of the mean if process standards are concerned and regulatory competition becomes effective only at the end of the interaction sequence.

Triple interaction of minimum harmonization, benchmarking, and regulatory competition is likely to lead to a downward shift or no shift of the mean if process standards are concerned and regulatory competition is first or second in the interaction sequence.

Conclusion

Our theoretical considerations on the causes and conditions of cross-national policy convergence in the environmental field indicate several general findings. First, the analysis of individual convergence mechanisms and their interaction indicates that fundamental shifts in the level of regulation can only be expected in rather specific constellations. Such scenarios are restricted to situations in which regulatory competition is the only or dominant mechanism to be effective. In all other cases, either upward or downward mean shifts are expected to occur on a less dramatic scale.

In particular, the likelihood for upward shifts generally increases with the extent to which benchmarking and minimum harmonization precede potential downward pressures induced by regulatory competition. By contrast, downward moves are more likely in constellations in which regulatory competition on process regulation becomes effective before cooperation or communication.

Second, the interaction of several mechanisms generally leads to an increase in cross-national policy convergence. In many instances, combined effects result in full convergence, with all affected countries adopting similar policies, or at least convergence at two levels (especially in cases where benchmarking overlaps with regulatory competition on process standards).

Third, the broad range of possible convergence levels, as suggested by our theoretical considerations, provides a plausible explanation for the rather mixed empirical findings which provide limited support for a general race to the bottom as a result of regulatory competition. The extent to which this scenario can be expected not only depends on the assumptions underlying the different theories of regulatory competition (see Levinson 1997; Wilson 1997), but also on possible interaction effects with other convergence mechanisms which might weaken or even prevent downward pressures on levels of environmental protection.

These interaction effects between different sources of policy convergence so far have hardly been investigated in the literature. The hypotheses developed in this article thus might constitute a promising starting point for empirical research into this field.

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Annex: List of Assumptions

No.	Assumption
1	The reference point for the analysis is a situation where no mechanism is at work and where the policies of the countries under consideration are characterized by diversity.
2	If another convergence mechanism becomes effective some time after the mechanism of regulatory competition, there is increased but not yet full convergence.
3	All countries fully comply with international law.
4	The level of international harmonization takes place at the mean of the national regulation levels.
5	In the case of minimum harmonization, not all high-regulating countries will lower their standards towards the minimum level.
6	In the case of benchmarking, the level of the benchmark is equivalent to the highest level of national regulation.
7	In the case of benchmarking, some, but not all countries raise their levels of regulation to the benchmark.
8	For the sake of simplicity, the initial regulatory distance between the countries is equal in the graphical illustrations.

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